

PATENT SPECIFICATION



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COMPLETE SPECIFICATION.

Improvements in Electro Plating Baths for Simultaneously Obtaining Metallic Deposits of Various Thicknesses.

We, WURTEMBERGISCHE METALL-WARENFABRIK, a German company, ALBERT WOLF, a German citizen, both of Geislingen-Steige, Germany, and EDGAR BAUER, an Austrian citizen, of 9, Wagramerstrasse, Vienna II, Austria, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

It is already known to produce a one working process a galvanic deposit upon metal of different thicknesses upon one and the same article this being done by arranging between the article and the anode or anodes, one or more walls of insulating material for the purpose of changing the thickness of the deposit these walls being provided with large and small incisions so that the parts of the article lying opposite said incisions receive a thicker deposit of metal than those which are protected by the wall or walls. It is also already known to suspend the articles in closed cells the walls of which are provided with openings for free passage through at those points which are to receive a thicker coating of the metal deposit.

It has been found that the openings provided in the protecting walls or in the closed cells for the thickening of the deposit are not always sufficient to obtain the required thickness of the deposit upon all parts of the article. This drawback makes itself especially noticeable in connection with badly conducting, that is to say with but slightly distributive electrolytes and causes unpleasant effects:

According to the present invention this drawback is obviated by providing the protecting walls or walls of the cells

with, in addition to the openings for the obtention of a thicker deposit, other additional openings which permit of a suitable thickness of metal being deposited upon those parts of the article which are not to be thickened.

These openings are so distributed over the surface of the protecting walls or cell walls and their form, diameter and the method of their distribution (in more or less compact groups in their turn distributed over greater or lesser parts of the surface) are so varied that practically all requirements as to the uniformity thickness and distribution of the galvanic deposit can be complied with.

For example, for certain purposes it has been found preferable to adapt the form and size of the perforations to the form of the thicknesses to be applied at each particular stage of the plating operation, and if at the parts lying between the perforations the layer of metal is desired to be thinner and uniform, then the openings are made of suitable smallness and uniformity and are distributed relatively speaking close together. In the case of a better conducting electrolyte however, these perforations may also be uniformly distributed but at a correspondingly suitable distance from each other and a somewhat larger size must be selected if the layers of metal are also to be of varied thicknesses at the thinner parts, it will be preferable to regulate the size by the application of groups of holes lying more closely together for the thick coatings and for places where the deposit is required to be thinner the groups of openings will not be so closely distributed. In this manner anyone versed in the art has it completely in his power to take steps in each particular case to

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obtain coatings of any desired thickness upon one and the same object in any working process.

In the accompanying drawings, eight examples of galvanic baths are shown for carrying out the process. Figures 2, 4, 6, 8, 10, 12, 14 and 16 each being a cross section through the galvanic bath and Figures 1, 3, 5, 7, 9, 11, 13 and 15 elevations of the protective walls or cell walls of the corresponding galvanic bath.

In the constructional example according to Figures 1 and 2, 1 represents the bath receptacle, 2, 3 the protective walls of non-conducting material, 4 openings provided in the protecting walls and 5 the diagrammatically arranged lines of flow from the anode 6 to the article 7; 8 is a uniform deposit or coating of lesser thickness whilst 9 is a thickened coating or deposit. The article 7 consists of an oval hollow plate, which in the centre of the concave surface is provided with a thickening portion 9. The openings 4 in the protective walls 2, 3 are uniformly distributed over the entire surface of the protecting walls. The openings 4¹ arranged in a protective wall 2, which lie opposite the part 9 of the article to be thickened and which serve to obtain the thicker deposit are arranged more closely together. In the constructional example according to Figures 3 and 4 there are arranged in the bath receptacle 1, protecting walls 2, 3 between which the article 7 is suspended. The article in this case consists of a rectangular hollow body which on both lateral surfaces is to be provided in each case with two circular thickened portions. The openings 4 in the protective walls 2, 3 are uniformly distributed over the whole surface thereof. The openings 4¹ lying opposite the parts to be thickened are enlarged so that upon galvanisation of the article 7 upon the parts desired thickened deposit, of metal 9 can be obtained. The remaining surfaces of the article receive owing to the smaller openings 4 on the metal deposits 8 of the lesser thickness. The lines of flow are marked 5.

In the constructional examples according to Figures 5 and 6 the article 7 suspended in the bath 1 consists of a rectangular plate, which is provided on both sides with a metal deposit 8 of slight thickness and upon one of these sides in the centre with a circular thickened metal deposit 9. The openings 4 in the protecting walls 2 and 3 extend only as far as the edges of the article 7 and are so arranged as to be uniformly distributed within this area. The openings 4¹ placed opposite the

thickening 9 are of a greater diameter than the openings 4 so that when galvanizing the article 7 the desired differences in thickness of the metal deposits 8, 9 is obtained. The line of flow running from the anode 6 to the article 7 are marked 5.

In the constructional examples according to Figures 7 and 8 the article suspended in the bath 1 consists of an oval plate which is to be provided with a metal deposit 8 of lesser thickness and upon one side with three metal deposits 9 of greater thickness. For the central thickening a cross shape and for two lateral thickenings a heart shape has been selected. The opening 4 serving to produce the metal coatings of lesser thickness up to the edges of the plate 7. For making the thickened deposits 9, perforations 12, 13, 14, are provided which correspond to the form of these deposits. 5 are the lines of flow from the anodes 6 to the article 7.

In the constructional example according to Figures 9 and 10 the article 7 consists of a round hollow body which is suspended in a round cell 2 corresponding to the article 7 and made of an insulating building material, 1 is the plating vessel protecting wall and 6 are the anodes. The reverse surface of the hollow body is to be provided with a metal deposit 8 of lesser thickness and with frame like quadratic reinforcements 9 upon diametrically opposed surfaces thereof. For this purpose the walls of the cells 2 are provided with uniformly distributed openings 4, which serve for the production of the deposit 8 of lesser thickness. The parts of the walls of the cells 2 which lie opposite the thickened parts 9 are provided with frame like openings 15 which are limited corresponding to the form of the thickenings 9. The lines of flow running from the anodes 6 through the openings 4, 15 to the article 7 are marked 5.

In the constructional form according to Figures 11 and 12 galvanizing is dealt with of a rectangular plate 7 which is to be provided with metal coatings of different thicknesses. The thicker metal coating 9 is to take the form of an oval ring. The openings 4 provided in the protecting walls 2, 3 for obtaining the galvanic deposit 8 are of equal size and arranged uniformly at equal distances up to the edges of the article 7. Openings 4¹ which are to serve for obtaining the thickened deposit 9 are arranged very closely together in the form of an oval ring in the protective wall 2. 5 are the lines of flow running from the anode 6 to the article 7.

In the constructional example according to Figures 13 and 14, the article 7 to be galvanized, consists of a corrugated bent plate which is to be provided according to the present process with different thicknesses of galvanic coatings 8, 9 in such a manner that the deposit or coatings 9 in the apex region of the corrugations form greater thickness and gradually decrease from the corrugation apices in both directions so as to form metal coatings 8 of less thickness. The protecting walls 2, 3 are provided with holes or openings 4, 4¹ of equal size. The holes or openings 4, 4¹ are so distributed that the compactness of their distribution is adapted to the thickness of the metal coatings to be applied to the article.

In the constructional example according to 15 and 16 the galvanizing is dealt with of a rectangular flat plate 7, one surface of which is to be provided with two crosswise diametrically running thick coatings 9 of gradually increasing thickness. The openings 4, 4¹ corresponding as regards their size, form and distribution to the increasing thickness of the metal coatings 8, 9 to be applied. 1 is a bathing vessel and 6 are the anodes whilst 5 designates the line of flow.

From the above statements it will be apparent that the selection of the correct form and size of the openings and their distribution in the intermediate insulating wall or walls or cell walls depends upon the article to be treated and the necessary conditions prevailing in each case. The degree of the thickening of the metal coating to be applied can however be varied not only by a suitable arrangement and selection of the type and size of the holes or openings, but also by the greater or lesser distance between the article and the side walls. At the same time the protecting wall or protecting walls, or walls of the cells can, as shown for example in Figures 1, 2, 9 and 10 respectively be adapted more or less to the article to be galvanized.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A process for simultaneously obtaining galvanic coatings of different thicknesses on one and the same article in which the article is arranged between walls or in cells of non-conducting materials, characterized by the fact that the intermediate walls or cell walls are provided not only with openings for obtaining the thickening of the coating, but also with openings for the unimpeded

passage of current which also ensures a suitable metal deposit upon the parts not to be thickened.

2. A process according to Claim 1, characterized by the fact that the form, size and type of the distribution of the openings in the non-conducting protective walls and cell walls are adapted to correspond to the desired layer thicknesses of the coating to be made.

3. A process according to Claims 1 and 2, characterized by the fact that the openings provided in the protective walls or cell walls for the thickened and non-thickened metal deposits are arranged in uniform distribution upon the surface of the protective walls or cell walls, as illustrated in Figures 3, 4, 5 and 6.

4. Process according to Claims 1 and 2, characterized by the fact that the openings provided in the protective walls or cell walls for the thickened and non-thickened metal coatings are of uniform size on the surface of the protective walls or cell walls as illustrated in Figures 1, 2, 11, 12, 13 and 14.

5. Process according to Claims 1 to 3 characterized by the fact that the openings of the insulating protective walls or cell walls are uniformly distributed on their surfaces and are enlarged at the points which lie opposite the parts of the article to receive a thickened deposit.

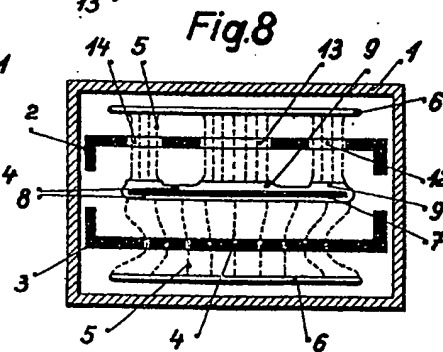
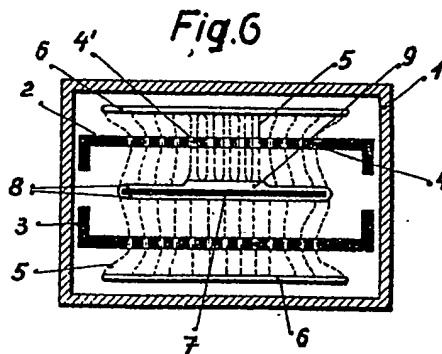
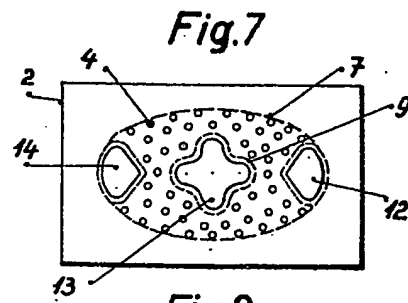
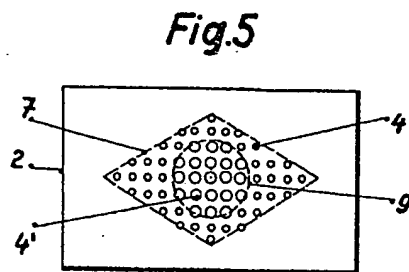
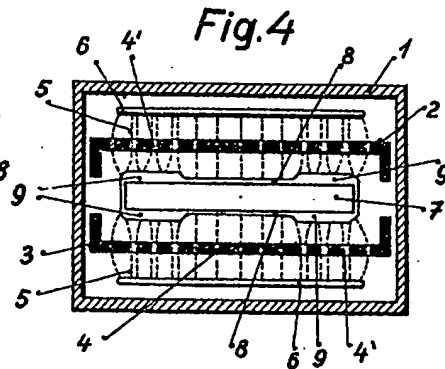
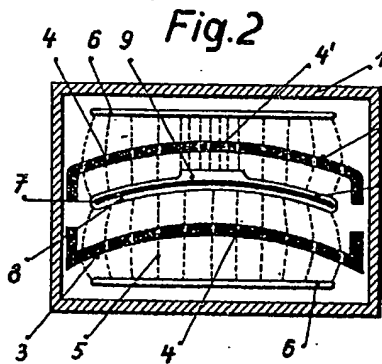
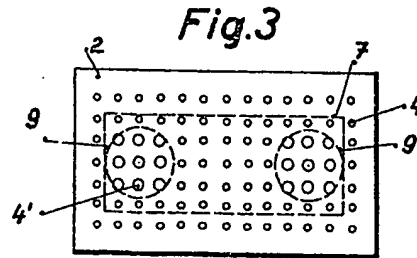
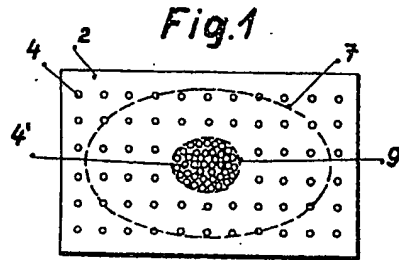
6. Process according to Claims 1 and 2, characterized by the fact that the openings in the insulating walls opposite the parts not to be thickened are uniformly distributed upon their surface, and the openings at the points which lie opposite the parts of the article to be thickened or strengthened, are shaped so as to correspond to the form of the strengthenings as illustrated in Figures 7 and 8.

7. Process according to Claims 1 to 3, characterized by the fact that the openings of the insulating walls opposite the parts not to be thickened are uniformly distributed over their surface, and the openings at the places which lie opposite the parts of the article to be thickened are enlarged and so restricted as to correspond to the form of the thickening as illustrated in Figures 9 and 10.

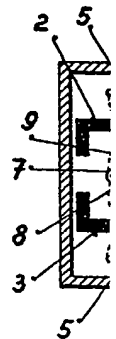
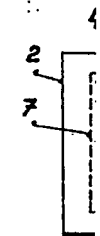
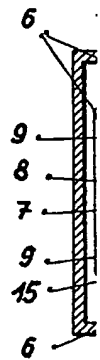
8. Process according to Claim 1, characterized by the fact that the openings of the insulating walls are uniformly distributed over the surface thereof but, at the places which lie opposite the parts of the article to be thickened are arranged more compactly than at the other places as illustrated in Figures 11 and 12.

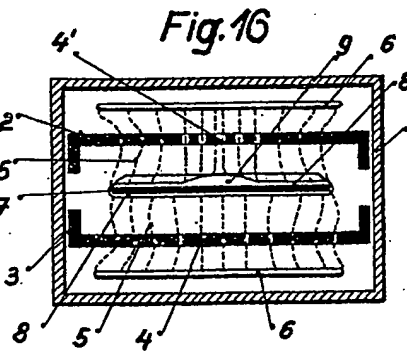
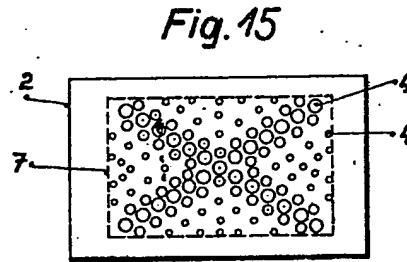
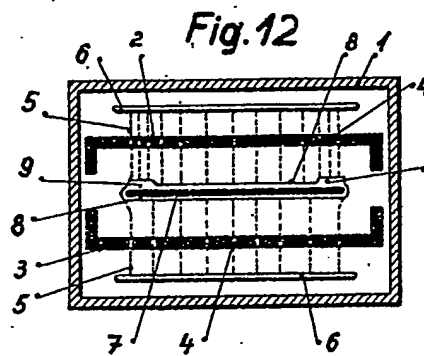
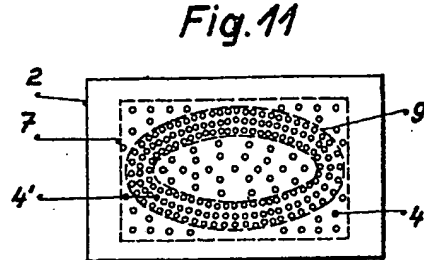
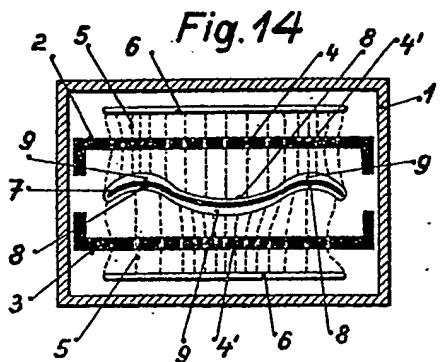
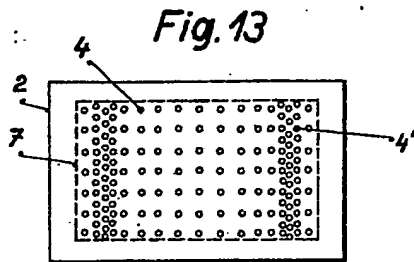
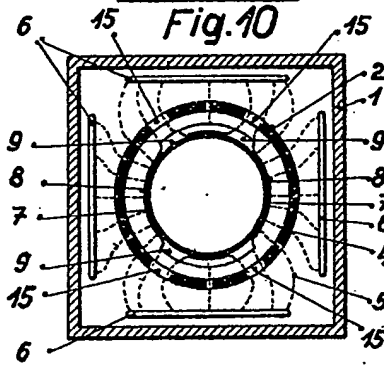
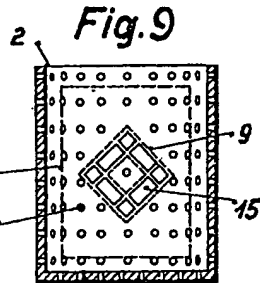
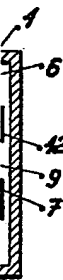
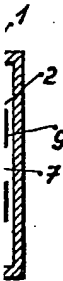
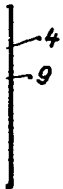
9. Process according to Claim 1, characterized by the fact that the openings of the insulating walls are of the same size but so distributed upon their surface that the compactness or closeness of their distribution is made to correspond to the thickness of the metal coatings to be applied to the article as illustrated in Figures 13 and 14.
10. Process according to Claim 1, characterized by the fact that according to the conducting power of the bath, and according to the greater or lesser thickness of the metal layers to be applied to the article on the one hand the size and form of the openings in the non-conducting intermediate wall and on the other hand the distribution of these openings in the non-conducting intermediate wall, can be so varied that corresponding to the increasing density or closeness of the metal coating to be applied the openings lying opposite are arranged more closely and of larger diameter than at the other parts as illustrated in Figures 15 and 16.
- Dated this 25th day of January, 1926.
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England; and
15, Park Row, New York, N.Y., U.S.A.,
Agents for the Applicants.

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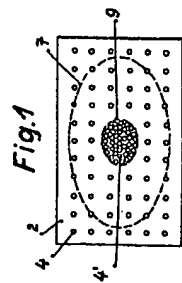


Fig. 1

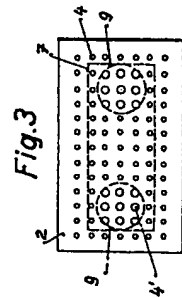


Fig. 3

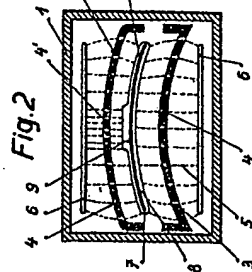


Fig. 2

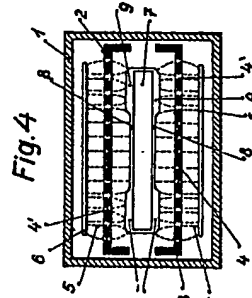


Fig. 4

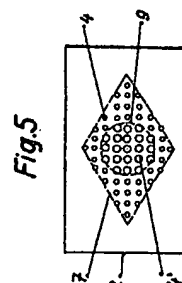


Fig. 5

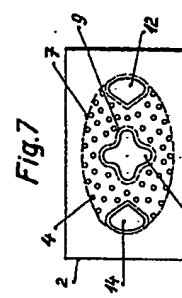


Fig. 7

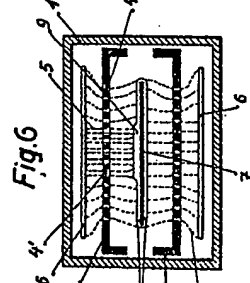


Fig. 6

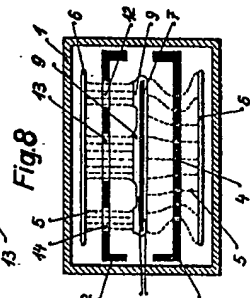


Fig. 8

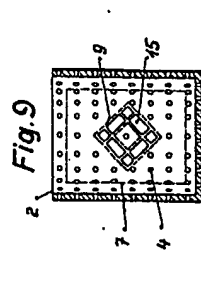


Fig. 9

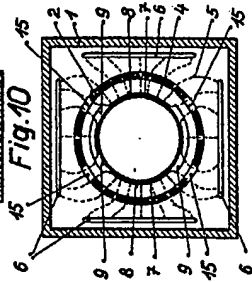


Fig. 10

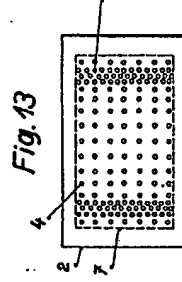


Fig. 13

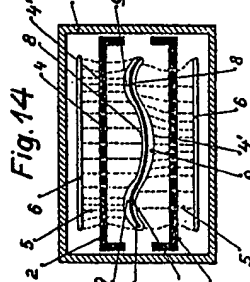


Fig. 14

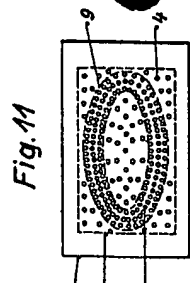


Fig. 11

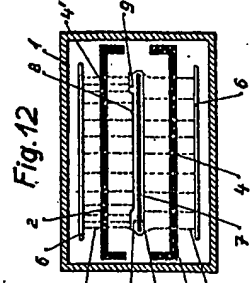


Fig. 12

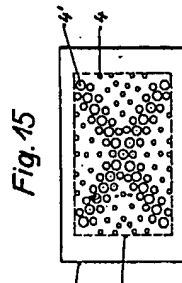


Fig. 15

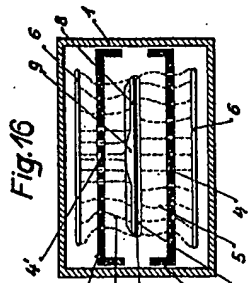


Fig. 16

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